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T. S COBBOLD, M.D.

The recently issued monumental final report of the Committee of Inquiry on Grouse Disease will draw some attention to the memory of that sterling worker, Cobbold. Many years ago Cobbold indicated a nematode as the cause of the well-known epidemic grouse disease. This was denied by Klein, who attributed the affection to a colon bacillus. The present Committee, in its exhaustive enquiry, found that Klein had made the error—commoner in those days than now, and largely explicable by the circumstances—of mistaking a putrefactive for a pathogenic organism. This point settled, undivided attention was focussed upon Cobbold's theory, and the accumulation of evidence gradually verified it. The *Trychostrongylus pergracilis* (Cobbold) may now be accepted as the cause of epidemic grouse disease, with the proviso that, like many other helminths, it appears to be harmful only when present in excessive numbers.

Cobbold died twenty-five years ago; but the value of his work is only now beginning to be fully appreciated. Every year, however, makes it more apparent. During his lifetime, of course, he was recognised as a great helminthologist—he was one of the few in this country to gain a permanent European reputation in the speciality; but in addition, so far as this country at least is concerned, he was the pioneer of parasitology, constantly pressing its claims to consideration at a time when pathologists in general seemed curiously unable to realise its importance. That time has passed away, and parasitology is now recognised as one of the most important of medical studies. Cobbold, more than any other Englishman of his time, paved the way for that recognition.

So far, the medical and veterinary professions owe a common debt of gratitude to Cobbold. The veterinary profession has additional and special cause to remember him kindly. Many old students of Camden Town still remember the value of his tutorial work on its staff. His strictly scientific work at the School is common property to helminthologists; for much of Cobbold's best original work lay in the veterinary half of his speciality, and a great deal of this was done at Camden Town.

When, a few years ago, a series of boxes at the London School were renovated and inscribed with the names of past veterinary worthies, we regretted that Cobbold's name was not perpetuated. It could easily have been done, and could be yet, by a combination of his old students. He did such yeoman service in a most important branch of comparative medicine that his long and close connection with the veterinary profession should not remain unrecognised.

IMPACTION OF THE OMASUM.

By HUGH BEGG, M.R.C.V.S., Hamilton.

One cannot help admiring the frankness of Mr. Hoare's appeal to his professional brethren for information relative to some of the obscure problems that attach to gastric derangements of the ox.

As the prospective author of a new text-book on Veterinary Medicine, it is gratifying to know that, in the preparation of his volumes Mr. Hoare is not content when he reaches a baffling obstacle simply to plagiarize the books of other authors (home and foreign) or to repeat their plagiarisms, and by mixing a little Irish spice to the old pabulum, hand it over to his readers as original matter. I think his attitude augurs well for what we may expect to find between the covers of his treatise.

No living veterinarian is capable of writing with a master hand on every phase of veterinary medicine, and probably ten men could be found who could write convincingly on equine digestive troubles for every one who would venture to tackle in an original way the similar diseases of bovines.

Before giving my humble opinion on Mr. Hoare's first query: "Does impaction of the omasum occur as a disease *per se*," I would ask: What are we to understand by impaction of the omasum?

I suppose we all believe that the contents of the omasum are always, in health, stored between its leaves in a drier state than are the contents of any other viscus in any of our ordinary patients, but, has any one ever seen the 3rd stomach of the ox distended to two or three times its normal size with dry food?

We often meet with enormous impaction of the rumen in the cow, extreme distention of the stomach of the recently weaned foal with indigestible grass, and every equine practitioner is aware of the extent to which dry impaction of the colon occasionally obtains in the horse, but, though the manyplies may, and does, vary in size, I cannot say I have ever seen it much increased in its dimensions or impacted in the sense that the rumen of the ox, the stomach of the foal or the colon of the horse very often are.

My experience among Aryshire dairy cows compels me to give an emphatic negative to this query.

Twenty years ago in the district in which I practised 50 per cent. of all the digestive troubles of the milch cow were considered cases of "Fardle bound," and permanent pastures rich in Timothy grass were considered a potent cause of the disease.

Without hesitation I can affirm that scores of dairy cows at that time were sacrificed by stock-

owners and veterinarians alike to the wholesale use of Epsom salts and treacle.

The history of the cases was as follows:—Early symptoms, refusal of food, decrease of milk, general depression and disinclination to move, with perhaps a degree of tenseness of the abdomen, irregular temperature of horns and ears, shallow breathing, expiration sometimes accompanied by a moan or grunt more or less audible, and if present more manifest when recumbent, fæces scanty and it may be constipated, though often normal at first in consistence.

The invariable first dose given was 1lb or more of Epsom salts and 3lb or so of treacle, and, when this was accompanied by the intelligent application of comfortable, well secured clothing, and the medicine, instead of purging quickly and copiously, acted as an aperient, the animal was often well on the way to recovery within 36 hours, normal peristalsis having been restored. But if the saline purge produced forcible and repeated watery evacuations, or, having hung fire, was followed by another, dose producing the impatiently wished-for result and particularly if the cow was inadequately clothed while undergoing the storm and loss of heat that accompanies copious watery evacuations, the latter state of the patient was found to be worse than the first.

The excessive activity of the bowels was followed by a degree of paresis resulting in the absence of fæces for a period. This, or the appearance of a little dry fæces (dry, because it had given up its water during a long and slow travel over an absorbing surface) was, at once alike the clue that the third stomach was blocked, and the excuse for giving another and probably larger dose of physic.

The devotees of this cult have been known to repeat the experiment for seven times before the animal succumbed, and though sad experience might have led them to doubt their tenets—you would find them at the post-mortem, pointing with pride to the third stomach which would turn up firm in consistence every time, and was held to justify (?) their shrewd diagnosis and treatment and illustrate the need for more herioc doses in the next case.

What were the other lesions that were ignored? Simply the toxicological lesions of Epsom salts and treacle, an outraged digestive canal—gastro-enteritis—the chocolate-coloured contents of the abomasum and bowels being plentifully mixed with blood clots, and we have frequently seen a portion of the bowel sausaged with blood.

That the omasum was found to be as firm or firmer in consistence than the same organ from a newly killed fat bullock (and we have seen many such that were difficult to pit with the toe of a boot) was but the natural result of its proximity to the intensely inflamed and sensitive abomasum.

The slight red staining of the contents and the free edge of the leaves of the omasum occasionally seen is invariably due to the backwash of the abomasal contents through the somewhat large and patent opening that connects the two compartments.

Many and varied are the diseased conditions which give rise to the common train of symptoms already referred to that were and are still considered pathognomonic of murrain and no hurried examination is sufficient to form a diagnosis and suggest proper treatment for the oppressed cow with a grunt. We have to be painstaking and deliberate in making deductions, if we would avoid the pitfalls of improper treatment, and particularly the blind use of purgatives.

The patients most commonly martyred by the action of purgative medicine have been those suffering from

1. Pleurisy affecting those parts of the pleura that are difficult or impossible to examine by auscultation.
2. Traumatic pericarditis in the early stage before hydrops pericardii has begun.
3. The presence of a foreign body at any part of its transit from the thorax into the second stomach.
4. Hepatitis, hepatic abscesses, etc.
5. Peritonitis, local or generalised.

I am convinced that local peritonitis immediately behind the lower third of the diaphragm (non-traumatic) is a very common lesion in thin milch cows. Witness the large number of carcases of old cows that exhibit the lesions of peritonitis (apparently non-tubercular) at this site.

The complaint is commonly met with at those seasons when the nights are chilly and wet, or frosty, and the dairy cows are out in the fields.

I am of opinion that senile animals deficient in fat contract peritonitis by a simple and complete chilling of the abdominal wall and the surface of the adjacent organs through prolonged contact with the cold earth. This happens all the more readily if the cow has been heated on the way to the field, and being tired she spends more time than usual in the recumbent position.

6. Congestion or inflammation of the abomasum.
7. The early stage of serious disturbance in the pregnant womb.

The Etiology of Gastritis.

I feel sure that the great majority of the cases of abomasitis which I have encountered before and verified by examination after death, have been directly caused or aggravated by the inordinate use of purgative medicine.

But we have often met with cases of a typhoid nature caused by ptomaine poisoning from the use of decomposing roots, in which the symptoms were sudden and grave, accompanied by high fever, and occasionally cerebral disturbance, the animal collapsing in two or three days.

In such cases the most constant visceral lesion revealed on post-mortem examination is gastritis, with hæmorrhages in the intestinal mucous membrane.

Again, it has been my experience that next to the peritoneum the sensitive abomasum is more liable to vascular changes from a serious chill than any other abdominal organ, and, under the influence and predisposition of certain digestive derangements—simple in themselves—abomasitis does

readily take precedence of peritonitis when the system has sustained a shock from undue exposure.

Further, we know that cows feed so grossly when free in the fields that they very often swallow acrid and poisonous vegetable, and even mineral substances, to which they have access, and though the rougher particles are so policed by the other compartments that they do not readily reach the abomasum, irritant solutions and juices soon reach the delicate mucous membrane of the true digestive stomach and kindle a fire there.

Sad experience has also led me rightly or wrongly to suspect that a sudden departure from a well balanced food to one on which the nitrogenous ratio is greatly increased, has been on several occasions the immediate or exciting cause of a series of fatalities in dairy herds.

Three years ago, in a herd of thirty dairy cows, the supply of turnips gave out, and because an order for bran had failed to arrive, the owner, to keep up the milk supply, increased the amount of soya meal from 4 to 8 lbs. per head. On the 3rd day three cows became seriously ill, I was called in and though the feeding was at once changed, other four cows sickened.

In five of the cases the illness was ushered in with violent rigors, the thermometer registering from four to five degrees of fever, complete suppression of milk secretion, diarrhœa bordering on dysentery, occasional colicky pains, restlessness and great depression. Each of these animals succumbed within three days, and the post-mortem lesions simulated those of a septicæmia, abomasitis being constantly present.

Smears made from ear blood were entirely negative, while those made from the lesions soon after death, revealed the ordinary putrefactive anærobes that abound in the blood of a decomposing carcase.

The illness of the other two cows was epileptiform, one made a fair recovery and the other had to be destroyed on account of traumatic pneumonia.

For obvious reasons, everything humanly possible was done to solve the mysterious etiology of this outbreak, but the investigations of the chemist and the bacteriologist and the kindly help of the Board of Agriculture were alike unavailing.

In the year that the different grades of soya meal were first introduced as substitutes for bean and pea meals. I encountered in various herds similar single cases that baffled treatment, and though suggestive of anthrax, were invariably negative.

Bean straw as a fodder for cows is eminently dangerous, and if given in quantity causes acute gastric derangement with the usual accompanying disturbance of the nerve centres, many of the sleepy, paralytic, almost comatose patients becoming absolutely mad before death

Finally, trouble in the abomasum is always to be expected and anticipated when an animal has swallowed a quantity of material that is known to be poisonously irritant.

In question (3) Mr. Hoare asks how, in a case of impaction of the rumen, the material is disposed of under the influence of purgatives, and he concludes by saying that if the medicine enters the rumen and reticulum first, it is not easy to explain how beneficial results are produced.

I am not sure that it would be fair to conclude that he is inclined to believe, as many do, that the contents of the rumen and reticulum never reach the abomasum etc. except *via* the mouth through the act of rumination.

That this is true of the grosser particles goes without saying, but it would be difficult to convince me that no liquids emerge from these compartments and reach the true digestive apparatus while the food is being churned and macerated by the powerful walls of the rumen. If I am wrong, will some one explain the following facts?

Years ago, when the prevention of milk fever appealed to us more than it does in these days of our emancipation by the great Schmidt, my favourite prescription was chiefly composed of 6 or 7 oz. of common salt and about 80 grs. of gamboge. I have repeatedly seen this drench given to a cow due to calve while she was in the act of chewing the cud. The immediate result of this interference was the suspension of rumination. With very few exceptions, the dose produced in six or seven hours copious watery evacuations, in the absence of any resumption of rumination.

Now, if liquid medicine measuring from 1½ to 2 pints enters only the rumen and reticulum, which seems proven, and if no assimilation is possible in these compartments, how are the facts which I have stated to be explained away except by a belief in the direct passage of fluid pabulum from these stomachs to the true digestive apparatus?

Further, I have often seen a considerable reduction in the size of an enlarged and firm rumen under the influence of purgative and nerve-stimulating medicine, though meanwhile the animal was never known to ruminate, while the droppings almost invariably contained gross material that had escaped the gauntlet of digestion.

I conclude that in those cases which die the "atony" of the ruminal walls has been so complete that we have failed to establish either the upward act of rumination or the onward movement of fluid pabulum to which I have referred. And I am of opinion that while the specific and more manifest action of these hydragogue purgatives is predilected to the true digestive organs, the medicine very often exerts an accelerating effect on the walls of the rumen through the vagus nerve which is the augmentor of that organ.

In question (4) Mr. Hoare says he has failed to find in all the text-books the slightest reference to "spewing of the cud."

I don't often consult Gresswell except in my lighter moods, but if Mr. Hoare looks up that author's "Diseases and Disorders of the Ox," p. 504-5 he will find some remarks on "Dropping of the Cud," and a fairly good illustration of a suffering cow. This author refers to the disorder as "simple indigestion."

I cannot subscribe to this view, as many of the cases I have witnessed were both serious and protracted. I do not know that we need differentiate, except in degree, between the occasional dropping

of portions of the bolus sent up during rumination, and a well established emesis. I take it that both extremes and all intervening degrees of spewing are dependent on somewhat similar though often obscure causes, and the quantity of food lost is small or great in proportion to the excitement of the rumen.

We know that under the influence of certain reflex stimuli, the contractions of the rumen are very great and often repeated. Observe a choking cow with the offending root lodged in the upper portion of the œsophagus. Reflex messages from the seat of choking set the rumen in active motion and repeated, almost rythmical waves of fluid are sent from that organ distending the gullet as far up as the obstruction to a degree far exceeding the dilation that obtains in ordinary deglutition, while a similar nervous phenomenon stimulates the salivary glands to great activity, so that below and above the obstacle is beset with tides of fluid intended to assist in its dislodgment. Even when not distressed in breathing by tympany, the choked cow is always more or less topsy turvy and nauseated, not from pain suffered in the gullet, but owing to the restless state of the rumen and its contents —an involuntary state of affairs.

Some of the most miserable and repulsive patients I have attended, were those cases of chronic emesis and cud-dropping, which suffered according as they ate, were happiest when hungry, and which revealed on post-mortem diseased conditions of the œsophagus itself or malignant growths involving or unduly pressing on some part of that organ.

That the seat of origin of the reflex act may, in many cases, be elsewhere than in the œsophagus I am convinced, but when Emesis is due to the baneful effects in the stomach of diseased, poisonous, or irritant indigestible food, it is usually sudden, complete and salutary.

The prognosis can never be favourable when "dropping of the cud," at first but little marked, gradually increases over a period of weeks, while the animal rapidly loses flesh, but I have known one such case make a sudden and unexpected recovery as if the bursting of an abscess had terminated the cause of disturbance.

Then we have occasionally seen a cow in perfect health when quietly chewing the cud throw up, for once only, such a mouthful that the buccal cavity could not retain it, and the liquid portion was sent awash over her lips to the ground while the animal, unheeding, continued perfect rumination, delivering upwards of sixty cuts to each bolus.

Beyond saying that this was due to some erratic stimulus to the rumen, need we theorize further? As well might we try to explain the conditions that cause a man, in due sobriety, to bite his own tongue when masticating his food.

We have also to recollect that cows occasionally "quid" food, as the horse does, when suffering from pain during mastication. Though "caries of the molar teeth" is a very uncommon condition in the ox, we occasionally meet with cases in which the teeth loosen and fall out owing to malignant disease of the alveoli. Such cases make a bad job of chewing either food or the cud, and the animal that has had the misfortune to wedge an unyielding foreign substance between her teeth and the cheek is in similar predicament. Certain "actinomycotic" conditions of the buccal cavity are also accompanied by quidding.

A CASE OF SUB-LUMBAR ABSCESS.

On Thursday, August 24th, I was shown a grey horse lying in a stable on its right side. It was said to be unable to rise, and when encouraged to do so made no effort to use the hind extremities. I was told that when it first lay down it kicked and struggled for some time, but offered no assistance to men's attempts to help it up.

My attention was drawn to two small round openings on the under surface of the tail—one quite on the firm part of the tail, the other close to the softer perineal tissues. A probe suggested they were superficial abscesses, but as one gave exit to a lot of thick creamy pus when pressed, I enlarged it and with my finger sought for any sinus. I could find none, so concluded that these were merely superficial abscesses unconnected with the inability to rise.

With the aid of slings we got the horse up and he stood well. The pulse and respirations were soon normal, and he was left eating hay. Temperature not taken.

The history of the case was that the horse had been away on military manœuvres and had returned very much out of condition. He went away on August 13th and did four days work without attracting any notice. Then an abscess on the root of the tail was discovered. It was opened, and to guard against infection from possible strangles the horse was isolated. He returned to London on August 20th and seemed well. On the 23rd a second abscess burst on the right side of the tail, above the anus. This was about the size of a crown piece. The pus which escaped was thick, white and creamy.

As I have said, I thought the abscesses were only superficial, and did not connect them with the inability of the hind quarters. At 6 p.m. the horse was standing quietly in the slings. At 5 next morning he hung in the slings so limp and powerless that the man in charge let him down. He lay quiet and died in about an hour.

Post-mortem.—The abdominal viscera were removed and showed no disease. The left kidney seemed very large, and it was removed with all its surrounding tissues—psoas muscles, etc. This mass was then cut into, and the kidney found apparently healthy. Behind the kidney and over the psoas muscle was a large abscess, the contents being white and almost caseous—in quantity about a quart. Further examination showed a sinus containing, here and there, similar pus. This sinus ran along the upper surface of the pelvis and was connected with the abscess at the root of the tail.

The lungs were not diseased, and unfortunately the heart was not examined.

The case is not one I am proud of, but I report it for the benefit of others. Possibly had I taken the temperature I might have found it high enough to suggest some septic change.

I am still puzzled as to the immediate cause of death, because the abscess must have been in about the same condition when the horse died as when the first appearance of pus under the tail was discovered.

I ought to add that neither the kidney, the psoas muscles, nor the spine seemed affected. The horse had been submitted to infection of strangles so far as occupying a stable in which cases had occurred before he went on the manœuvres.

W. H.

RADIOTHERAPY.

The few remarks which follow are of a wholly theoretical and speculative nature, one may therefore be pardoned, perhaps, for having adopted a somewhat hypothetical title.

Speculation and pure theory are of course considered directly opposed to practical efficiency by a section of our professional community, and those who hold these views will do well to skip this article. It seems a pity that the question of Theory *versus Practice* should ever have arisen, as they are essentially complementary, and their combination in one individual should be the ideal of professional excellence. It is conceivable that, satiated for the moment with the substantial diet of practical work, one might in a season of leisure allow the intellectual faculties full sway to wander into realms of pure speculation.

The discovery of radio-activity is no new thing, but it is only recently that the indefatigible researches of scientists have brought it into the sphere of practical politics. The nature of Radium, the method of isolating it, and the phenomena by which it is recognised, are widely known now, but for those who have not studied it a few prefatory remarks may be allowed.

Radio-active substances, as their name indicates, are chiefly characterised by the power they possess under certain conditions of emitting Rays for an indefinite period without undergoing appreciable loss of substance. These rays are capable of conducting electricity, and this is the phenomenon which has led to their discovery, and the possibility of isolating the substances that emit them. Many speculations have arisen as to the source of these rays, and it is of course open to everyone to make his own choice, but the most feasible idea, in my humble opinion, is that set forth by Dr. Gustave le Bon in his work on "The Evolution of Matter." He assumes that these rays are composed of matter in a transitional state, arising from the disassociation of atoms. He holds in short that the law of indestructibility of matter is an erroneous law and that the atom is capable of disassociation into the ether "from whence it came."

In the course of this disassociation an immense, almost incalculable, amount of kinetic energy is liberated, prodncing a force able to drive the particles in the form of rays through material substances. Radium is not the only substance that has the power of emitting these rays; it is now known that many substances have the same power to a modified extent. Le Bon has shown that during a *chemical reaction* rays are emitted. The practical method of demonstrating the existence of these rays is to place the substance to be tested in such a position that the rays can fall on a charged electroscope. A description of the technical details of the experiments would be tedious and out of place in this brief article.

Should the substance prove radio-active a discharge of the electroscope occurs along the line of emanation. In this way radium is obtained. By an intricate process of re-crystalisation, etc., from an admixture of radio-active substances, a residuum is at last procured with a maximum power of emitting rays conductive of electricity. With these preliminary remarks one may pass to a conisderation of the therapeutical possibilities of the utilization of this tremendous liberation of intra-atomic energy, as evidenced by the rays.

The first experiments known to me in Veterinary work have been directed to testing the effect of Radium enclosed in a tube, inserted in the frog for navicular disease, and buried in the tissues for the treatment of tumours.

The experiments as yet have been too few for satisfactory conclusions to be drawn. The theory, in the consideration of which I would crave your indulgence, is based upon the possible influence that radio activity, or deliberation of intra-atomic energy, may have in the therapeutic action of certain "specific" drugs. The number of accepted specifics is small, but their existence is undisputed. Potassium iodide in the treatment of actino-mycosis may be taken as a good concrete instance. The action of this drug is inexplicable by any hitherto adduced hypothesis. One speaks vaguely of "double decomposition," but it amounts to nothing as an explanation. May it not be possible that a chemical reaction with certain elements of the diseased tissue of micro-organisms occurs, leading to the liberation of intra-atomic energy and in some obscure way to destruction of the diseased tissue and the micro-organisms simultaneously? This theory would help to explain the enormous effect of such a small dose of the drug. When one considers the dilution that must take place, and the infinitesimal amount of the drug that is eventually determined to the diseased area, it is helpful to remember that a liberation of intra-atomic energy may multiply the power almost indefinitely.

As Gustave le Bon states, the intra-atomic energy contained in such a relatively small compass as an ordinary penny would, if the means were discovered to suddenly liberate it, annihilate the experimentor and level all the buildings in the vicinity to the ground. Without necessarily accepting these calculations, although those of a scientist of European reputation, it is indisputable that the potential energy resulting from disassociation of the atom is almost incomprehensibly great.

It is superfluous to multiply instances of specifics. The single one given is sufficient for the purposes of this theory. The factors necessary before a specific effect can be obtained are, the affinity of a certain drug for certain tissues or micro-organisms, chemical reaction, and the consequent liberation of intra-atomic energy (?) One might dilate much upon this point, but enough has been said to demonstrate a possible explanation of the action of "specifics."

It should not be supposed that it is intended to claim the agency of this factor in the action of drugs generally. Like Mr. Wallis Hoare, I am, on the whole, sceptical as to the alleged utility of the majority of drugs. To my mind the average text-book on therapeutics is a touching illustration of the credulity and simple faith of mankind. It is only with regard to certain drugs of specific action for certain diseases that the possible influence of intra-atomic energy is deserving of consideration. At present the chief physical evidence we have of the liberation of this force is that which takes the form of rays, but it is not, in my opinion, going too far to suppose that it is capable of being manifested by other forms, governed by laws as yet unknown to us. In this way it may play a prominent part in the action of those mysterious substances the organic ferments of nutrition, and nervous and muscular energy, and of other physiological phenomena hitherto inexplicable. The definition of a ferment, a substance causing chemical change without itself undergoing perceptible alteration, bears an analogy to radium that is significant enough to awaken interest in an enquiring mind.

WAKEFIELD RAINEY, Capt. A.V.C.

ABSTRACTS FROM FOREIGN JOURNALS.

ULCEROUS "LEG AND LIP DISEASE" OF SHEEP.

Melvin and Möller (*Revue Vétérinaire*) give an account of this disease. It has been studied successively by Gilruth, who called it Eczema of the face; then by Clayton, who discovered its microbial nature; and afterwards by M'Fadyean, Williams, Moussu, Benoist, Cadéac, Leclainche, and Vallée, Knowles, Law, and Wing and Flock, who described the venereal form for the first time.

The lesions may appear upon every part of the body, but the parts covered with wool are least exposed. Traumatisms favour the appearance of the disease. Sometimes the affection is benign, and sometimes virulent; and several forms of it have been studied.

One form is localised to the lips and legs. It may be acute, with inflammation, ulceration, and necrosis: the bacillus of necrosis being found in the lesions. On the other hand it may be chronic, with stationary lesions and without tumefactions.

A second serious form—the so-called venereal form—is localised to the prepuce in the male, and in the female to the vulva, which is ulcerated and presents a muco-purulent discharge.

A third form, called "Red Foot," is localised to the feet, and especially to the heels and the interdigital space. The ulcerous lesions extend to the sub-ungual tissue and give rise to an infectious discharge.

A fourth form is observed in lambs and is situated upon the buccal mucous membrane, which shows small ulcers and fungoid elevations of a cheese-like odour.

The disease results from the introduction of the necrosis bacillus into the organism by means of traumatisms. The bacillus is widely distributed in nature, but it only penetrates the organism by means of a wound. When established in the organism, it secretes toxins which are necrosing in their action and which may affect every tissue.

The bacillus may affect other species of animals than sheep, causing serious lesions; and prophylaxis should therefore be extended to all species. The infection is spread by litter.

Prophylactic measures should of course be adopted, viz., separation of the affected from the healthy animals, careful examination of animals which have been exposed to the chance of infection, and complete disinfection of the sheds and sheep pens.

The curative treatment is based upon disinfectant lines. The diseased surfaces are cleansed; and the ulcers, in mild cases, are treated with an emollient of cresol 5 parts, sulphur 10 parts, and vaseline 100 parts, and, in serious cases, with more active agents—10 per cent. chloride of zinc or 1 part in 7 of nitric acid. In the venereal form of the affection, the ulcers are cleansed and cauterised, and this is followed by injections of permanganate of potash, 1 in 500. Buccal lesions are washed with a solution of 2 per cent. of potash chlorate, or one of 1 per cent. creolin.

In Germany, a simultaneous internal treatment is also recommended, creosote being given in cod liver oil.—(*Annales de Méd. Vét.*)

[I think that there have been instances of this affection having been mistaken for foot-and-mouth disease.—TRANSL.]

SECONDARY CEREBRAL LOCALISATION OF POLYPI IN THE VAGINA.

Jougla records (*Revue Vétérinaire*) a case of a spaniel bitch affected with numerous polypi, some pedunculated, in the vagina. These were operated upon by excision and currettage. Ten days later, the operation was to be repeated, when the condition of the animal arrested attention. She was somnolent, showed cutaneous hyperæsthesia, and moved towards the left. The eyes were wild, the pupils dilated, and the retino-papillary reflex suppressed. A digestive auto-intoxication due to obstinate constipation was first suspected; but as the condition persisted despite treatment appropriate to this diagnosis, cerebral metastasis appeared probable.

Post-mortem (it is not stated whether the bitch died or was destroyed) the alimentary tract showed lesions of gastro-duodenitis. The viscera were free from metastases. The polypi in the vagina had

recurred. The left cerebral hemisphere was hyperæmic. A horizontal section of the brain passing above the optic layers revealed a neoplasm situated in front of the corpora quadrigemina and occupying the floor of the lateral ventricle.

The tumour had all the macroscopic characters of a vaginal polypus; it was fibro-lardaceous, vascular, and clearly encroached upon the nervous system. Microscopical examination showed the identity of vaginal tumours and cerebral neoplasm, both of which had the characters of lymphosarcomata.—(*Annales de Méd. Vét.*)

Urine Testing in the Diagnosis of Foreign Bodies in the Bovine Reticulum.

The diseases due to entrance of a foreign body into the reticulum are accompanied by more or less marked peritonitis, which in most cases determines the appearance of albumen in the urine, This has led Neidinger *(Oesterr. Wochens. für Tierheilk,)* to test the urine in 33 cases, all cows, using the nitric acid reaction. Upon post-mortem examination, the diagnosis was confirmed in 29 cases. In four cases a foreign body was present when albumen had not been found in the urine; but in these cases the section revealed only slight and dry peritonitic lesions upon the reticulum. Neidinger therefore holds that in cases where a foreign body in the reticulum is suspected, testing of the urine is of essential importance as a diagnostic measure.—(*Berliner Tier. Woch.*)

W. R. C.

BRACKEN-POISONING.

In the laboratory report for 1909, reference was made to an affection of cattle which it has been customary to attribute to poisoning by bracken. Feeding experiments were also carried out with large quantities of bracken taken from the pastures where the animals had been grazing. The results of these experiments, however, were negative, and no experimental proof of the bracken being poisonous was obtained. It was also pointed out that the symptoms and lesions of the affection, whatever it might be, were so constant that one was justified in concluding that they arose from the same cause in each case.

The symptoms and lesions, however, were not such as one would expect to arise from a poison; firstly, because the affected animals showed a very high temperature during life—106 to 107 F.; and secondly, because, although the intestine was the seat of the most marked changes, general lesions were found throughout the internal organs.

During the year under report, several outbreaks of the same illness have occurred, and the opportunity of further inquiring into the disease was taken, but, as previously pointed out, little progress can be made in any one year, as the illness seems only to occur during a short season.

A quantity of cut bracken was obtained from pastures in the North of England, where illness amongst the cattle was occurring.

The bracken was fed to heifer No. 249, but, in order to get the animal to consume it, it had to be mixed with a small proportion of cut grass and sharps. Between August 14th and 20th the animal consumed, approximately, 60lbs. of bracken. After the first two meals, which together contained about 30lbs. of bracken, the heifer showed symptoms of indigestion, but apart from this no toxic symptoms were observed, and the temperature remained normal.

From the 20th August, that is when the heifer had consumed about 60lbs. of bracken, the latter was discontinued in the feed, and the animal was carefully observed during the week following; no symptoms of illness appeared.

In the course of another inquiry, the owner of the animals stated that he believed the disease was caused by a weed which he referred to as "Tormentil."

This weed was identified at Kew as *Potentilla Tormentilla*, Linn.

It is very widely distributed in Great Britain, and is usually looked upon as quite harmless. To obtain further information regarding its effect on animals, a quantity, amounting to about 3 lbs., was removed from pasture on which the disease had appeared, and it was fed to heifer 211 at the laboratory. Eight days after consuming the weed the temperature rose to 103 F., and for a further period of eight days it fluctuated between 102·8 and 104·2 F. Otherwise, however, the animal showed no signs of ill-health, and it was concluded that the feeding experiments had probably nothing to do with the rise of temperature.

A second outbreak of so-called bracken poisoning was reported from Buckinghamshire, and Mr. Jackson, one of the Board's Veterinary Inspectors, who made inquiries on the spot, observed that the same weed was very prevalent on the pastures, and decided to bring back a quantity for further experimental observation.

Between 4 and 5 lbs. of the weed was fed to heifer No. 188. On the evening of the third day, after the weed had been consumed, the temperature of this heifer rose to 106 F., and it fluctuated between 103 and 106 for three days. Coincidently with the rise of temperature, the animal showed symptoms of decided illness. On the fifth day after feeding on the weed the heifer suffered from diarrhœa, and a considerable quantity of blood was passed in the fæces. The diarrhœa and evacuation of blood continued for three days, after which the animal appeared to be improving, and it was decided to kill her in order to observe whether the lesions attributed to bracken-poisoning were present. She was killed on the twelfth day after receiving the weed. Lesions identical to those found in conpection with the outbreaks in the field were present in the intestine, but systemic lesions were absent.

The cæcum showed a perfect network of black lines, due to hæmorrhage in the sub-mucous tissue, and a large area of the posterior bowel showed broad longitudinal hæmorrhages not unlike what one sees sometimes in cattle plague and East Coast fever. In the other parts of the bowel many small hæmorrhagic areas were found irregularly distributed. As these lesions were practically identical with those found in animals dying in the field from so-called bracken-poisoning, though they were somewhat less severe, and as they had occurred in an animal at the laboratory, where the disease was unknown, after feeding with the weed known as Tormentil, it was decided to obtain a further quantity from the same place for another experiment. It was arranged that freshly cut Tormentil from the same pasture should be sent to the laboratory daily for a few days. It should be noted here, however, that, whereas we were certain that the weed which was given to heifer 188 had been taken from the place where the sick animals were actually grazing, that sent up later was collected at various places where, possibly, the animals had not grazed when ill.

On September 6th, heifer No. 123 was fed with 4 lbs. of the weed, all of which was eaten. On September 7th, the temperature was normal, but the animal was very dull, and a small quantity of blood was passed with the

dung. On September 8th, 6 lbs. of Tormentil was fed, and on the 9th September the animal received a further quantity of 4½ lbs. The temperature remained normal, and the animal showed no signs of internal disturbance after that noted on September 7th. As no other animals were available for experiment at the time, the observations were not carried further, but it will probably be possible to continue them at a future date, when the disease appears again in the field.

In considering the observations which so far it has been possible to make, the following remarks on the nature of this apparently mysterious disease seem warrantable:—(*a*) that the high temperature, which accompanies the clinical symptoms, is contrary to what one finds in illness due to poisoning; (*b*) that the negative results of the experiments described in this report and in that of 1909, in which large quantities of bracken were fed to cattle at the laboratory, furnish a considerable amount of evidence against the opinion that the illness is due to poisoning by bracken; (*c*) that the fact that a case of the disease was produced in a heifer at the laboratory by feeding on material which contained no bracken, is further evidence against the latter substance being responsible for the illness; (*d*) that the positive result of the experiment on heifer No. 188 after feeding on Tormentil at the laboratory is by no means to be taken as proving that the illness originates from feeding on Tormentil, which is very widely distributed in this country, and is generally regarded as a harmless weed, especially as one must not neglect the possibility that the illness is due to some form of contagion, which may have been carried to the laboratory with the Tormentil from the pastures on which the sick animals were grazing.

WARBLES.

It has been possible during the year under report to make a number of observations in connection with warbles and the warble-fly. Through the kindness of J. Lindsay, Esq., National Federation of Meat Traders' Association, two cattle, which had been pastured in a warble-fly district during the fly season of the previous year, were sent to the laboratory for observation in April, 1910, that is to say, at the time warbles were distinctly apparent under their skins. The animals had been pastured on marshy land round about Dagenham in Essex. Unfortunately for our purpose, they were not very badly infested with warbles, but a sufficient number—about 20 in all—was obtained to enable some useful observations to be made. The animals were carefully examined from day to day, and as soon as the first nodules showed signs of bursting, the animals were tied up in pens in a glass-house, and visited about every hour during the daytime.

It is well known that flies seldom emerge from warbles which have been pressed out by force from under the skin. It has also been stated by several writers that it is very difficult to observe the warble making a spontaneous exit from the tumour, and to explain this it has been suggested that the exit is made during the night. The experience at this laboratory has been contrary to these statements. Tumours on the skin with gradually expanding orifices were marked, and carefully watched, and in no case was a warble known to make its exit during the night. On the contrary, it was found that exposure to the sun's rays seemed to favour the exit from beneath the skin. Sometimes a warble was ejected with considerable force, owing probably to sudden rupture of the attenuated, restraining, tissue at the surface of the nodule, and in one case the exit was accompanied by a report like that of a pop-gun. In the majority of cases, however, the warbles were observed to wriggle out of the tumour, and even remain for a little time on the coat of the animal, when the immediate fall from the host's body was not too perpendicular. Once they gained the ground, they were observed to wander about slowly but continuously, until they found themselves in a shady place, when they curled up, and became quiescent. They could be made to curl up almost immediately after exit by covering them with a large pill box, and if they were exposed again to the sun's rays by removing the box before the outer surface of the pupa-case had hardened, they could be observed to start wandering again quite actively. So far as our observations go, the outer skin seems to become quite rigid in less than 24 hours after the warble has been placed in the shade.

The first warble was observed to make its exit on the 31st May, during sunny weather. The others continued to come out until the 12th June. Sixteen of these warbles were placed in a cool, shady room, in special cages made of mosquito netting, and a note was made against each of the date upon which it was obtained from the animal.

Flies were obtained from six of these—

No. of Warble.	Date obtained from host.	Date fly emerged.	Date fly died.
1	May 31	July 3	—
2	June 2	„ 12	July 25
3	„ 3	„ 12	„ 29
4	„ 12	„ 25	„ 29
5	„ 12	„ 5	—
6	„ 12	„ 5	—

The dates on which flies Nos. 1, 5, and 6 died were not noted exactly, as they died in the same cage, and could not be identified. All three were dead, however, by July 19th.

When kept in a cool and shady room the flies crawled slowly about the cage, but they did not appear to be torpid. When the cages were taken out into the sunshine, however, the flies became very active, and flew about the cages making a loud buzzing sound. Three flies, believed to be one male and two females, were put in one cage, which was suspended in the sunshine. The flies were carefully watched, and attempts at copulation seemed to be made. No eggs, however, were produced, although the flies were given an opportunity to lay on the back of an ox.

Immediately after death the flies were sent to Mr. E. E. Austen, of the British Museum, South Kensington, who was good enough to identify them as *Hypoderma bovis*, Deg.: the species which is said to be least prevalent in this country. Two pupa-cases, which were obtained on the 10th June and from which flies had not emerged, were dissected on the 10th September. Only a dried mass, like solidified liquids, was found in the interior, and no appearance of any fly structure could be found in it.

The average period of time before these six flies emerged was 33·6 days; longest, 44 days: shortest, 23 days. Assuming that the three flies, the dates of whose deaths were not exactly noted (the three died within a couple of days of each other), lived until the 19th July; the average duration of life was 13 days; longest, 17 days; shortest, 4 days. The latter period, however, seems exceptionally short.—*Jour. Board of Agric.*

The beginning of the Barnet Fair, which holds this week, is unknown. Henry II. gave to the Monastery of St. Albans the right to hold a market at Barnet, from which time it has been known as Chipping Barnet, from Ceapon, a Saxon word signifying to buy and sell.

DISEASES OF ANIMALS ACTS 1894 TO 1910, SUMMARY OF RETURNS.

Period.	Anthrax. Outbreaks Confirm'd	Anthrax. Outbreaks Reported	Anthrax. Animals Confirm'd	Anthrax. Animals Reported	Foot-and-Mouth Disease. Outbreaks	Foot-and-Mouth Disease. Animals.	Glanders (including Farcy) Outbreaks	Glanders (including Farcy) Animals.	Counties Affected Animals Attacked	Sheep Scab. Outbreaks	Swine Fever. Outbreaks.	Swine Fever. Slaughtered. *
GT. BRITAIN. Week ended Sept. 2	22		24				7	9		1	31	541
Corresponding week in 1910		20		21			3	13	Essex 1	4	29	146
Corresponding week in 1909		18		34			9	17		1	23	206
Corresponding week in 1908		16		18			21	41	London 7	1	19	417
Total for 35 weeks, 1911	583		728		8	425	132	212	Middlesex 1	307	1768	20798
Corresponding period in 1910		1000		1207	2	15	251	775		339	1000	8858
Corresponding period in 1909		905		1211			375	1360		471	1249	10995
Corresponding period in 1908		758		1013	3	112	566	1783		637	1471	8500

Board of Agriculture and Fisheries, Sept. 5, 1911.

									Parasitic Mange (outbreaks)			
IRELAND. Week ended Sept. 2	...	...	...	...	...	...	1	...	1	4		
Corresponding Week in 1910 ...	...	...	...	...	...	...	2	1	...	...		
Corresponding Week in 1909 ...	...	...	...	...	...	...	1	...	...	38		
Corresponding Week in 1908 ...	...	...	...	...	...	...	...	2	2	114		
Total for 35 weeks, 1911 ...	7	14	...	...	2	3	52	253	91	1579		
Corresponding period in 1910 ...	5	8	...	...	1	2	54	349	71	1693		
Corresponding period in 1909 ...	5	5	...	...	...	...	64	305	82	1505		
Corresponding period in 1908 ...	6	9	...	...	...	...	31	274	132	2863		

Department of Agriculture and Technical Instruction for Ireland, (Veterinary Branch), Dublin, Sept. 4, 1911

NOTE.—The figures for the Current Year are approximate only. * As Diseased or Exposed to Infection

PTOMAINE POISONING.

By H. J. HUTCHENS, D.S.O., D.P.H. Oxon., M.A. Health Professor of Comparative Pathology and Bacteriology in the University of Durham.

Ptomaine poisoning is a popular rather than a scientific term used to describe an illness following, and attributable to, the consumption of a particular article of food. In nearly all cases the symptoms are of the nature of a gastro-enteritis, and it is further characteristic of the disease that by far the greater number of those who have partaken of the incriminated food suffer from the disease. The term ptomaine poisoning is inexact, because it leads by inference to the assumption that the symptoms are due to ptomaines, while in fact, as will be shown, these substances are not the cause of the disease. The word ptomaine (from the Greek, a corpse) was introduced by the Italian toxicologist Selmi to describe certain chemical substances more or less allied to the vegetable alkaloids which had been found in putrescent meat and decomposing albuminous matter.

BACTERIA AND PUTREFACTION.

In the earlier part of the last century, as the outcome of investigations by Panum and others, it had been shown that substances of a poisonous nature, chemically resembling the vegetable alkaloids, were present in decomposing animal matter, and these substances were later made the subject of an elaborate investigation by Selmi, and later still by Brieger and others. The result was that a number of definite chemical compounds, having many properties in common with one another, were isolated from decomposing flesh, etc. When the relation of bacteria to putrefaction had been proved by Pasteur it was recognised that these alkaloidal bodies were the products of bacterial activity. And the further researches of Pasteur and Koch, which established the micro-organic nature of the infective diseases of man and the lower animals, gave a great stimulus to the investigation of the products of micro-organisms, because it very soon became evident that the infecting micro-organisms exerted their effects by means of chemical products elaborated by them in the medium in which they happened to be growing, whether that medium were the living body or an artificial culture medium. The truth of this view of the nature of the action of micro-organisms was proved in 1880, when Pasteur showed that by the inoculation of filtered, and therefore sterilised, cultures of the organism of fowl cholera he was able to reproduce the disease in susceptible animals just as though he had inoculated the living organisms.

VARIETIES OF PTOMAINES.

The detection of alkalodial bodies in unsound meat led to the opinion that the symptoms following the consumption of such meat was directly due to them. This explains the origin of the expression ptomaine poisoning. As the result of the work of Selmi, Brieger, and later observers, a considerable knowledge of ptomaines has been acquired, and a large number have been isolated and their chemical composition determined. Vaughan gives a list of fifty-seven different ptomaines, the majority of which have received names indicating more or less, in most cases, the sources whence they were originally obtained. At first the ptomaines were regarded as characteristic products of the decomposition of animal matter, and the word itself would indicate that this was their origin. The majority of ptomaines have no doubt been obtained from putrescent meat or flesh, but they are also found under other con-

ditions. Muscarin, for instances, is the active principle of poisonous mushrooms, but has also been obtained from decomposing flesh.

What is a Ptomaine?

A ptomaine may be defined as "an organic chemical compound, basic in character, and formed by the action of bacteria on nitrogenous matter" (Vaughan).

Ptomaines "are to be regarded as extracellular products of bacterial activity. They do not originate within the bacterial cell, and therefore are not to be looked upon as direct metabolic products of the cell protoplasm, but rather as secondary cleavage products." Many of the ptomaines belong to the benzene series and are derivatives of pyridine; others are hydro-carbon derivatives. Most of them, either in their chemical or physiological reactions resemble the vegetable alkaloids. "Some may be obtained from a variety of decomposing substances, irrespective of the type of organisms present." They cannot, therefore, be regarded as the specific products of bacteria. They are found in only very small amounts in decomposing animal matter, and it is only when meat is in so advanced a stage of decomposition as to be totally unfit for human food that they are present at all.

Moreover, many of the ptomaines are non-poisonous, and the majority of those that act as poisons exert their influence on the nervous system rather than on the alimentary system, which is further evidence against their being the cause of the symptoms of food-poisoning, since in the great majority of cases the latter are of the nature of a gastro-enteritis. (There is, of course, a definite class of epidemics of food-poisoning, in which the active substance is of the nature of a neuro-muscular poison. This, however, is not a ptomaine, and reference will again be made to this particular form of food-poisoning under the head of Botulism.)

Food Poisoning.

On various grounds, therefore, ptomaines can no longer be considered to be the cause of food-poisoning. It would perhaps be exceeding the limits of what has been definitely established experimentally to say that ptomaines never cause symptoms of food-poisoning, but all the available evidence is against their playing any part in the production of those symptoms. The ptomaines have, therefore, largely lost their interest for the bacteriologist. But to the toxicologist they are of supreme importance, to which fact the recollection of a recent criminal trial will bear witness.

Food-poisoning is now attributed to the specific poisons of bacteria. Chemical investigation has shown the presence in culture media in which bacteria have been grown of numerous substances of a highly complex nature, ptomaines, tox-albumins, albumoses, etc., but all attempts so far to determine the nature of the specific bacterial poisons by chemical means have failed.

Toxins.

The specific products to which the action of bacteria on the tissues is due are known by the generic name *toxin*. Toxins differ from all such substances as ptomaines, tox-albumins, etc., in that they are specific. They are "the result of synthetical processes occurring within the bacterial cell." Bacterial toxins are the most poisonous substances known. It has been shown, for instance, that 1 c.c. of a particular broth culture of tetanus contained 0.025 gramme of organic matter, and that that quantity contained sufficient toxin to kill 100,000 mice. Even assuming that the whole of the 0.025 gramme of organic matter was toxin, which of course is was not, the example serves to show the extremely poisonous nature of bacterial toxins.

It is to these toxins that the symptoms following the invasion of the body by bacteria are to be attributed. And when it was shown that food-poisoning could not be regarded as a ptomaine effect it was thought that the symptoms must be due to bacterial toxins present in the meat. This is undoubtedly true in some cases. But Gärtner's observations during an epidemic of food-poisoning at Frankenhausen in 1888 showed that food-poisoning was at least sometimes an infective disease. And, as a matter of fact, in most cases food-poisoning is a specific infective disease, and is the result of poisoning by bacterial toxins. The toxins may be present in the food before it is eaten, or they may be elaborated in the human body. The former condition gives rise to a toxæmia while the latter is a true infection, resulting from the ingestion of organisms contained in the food which has been eaten. The latter condition is due to a small group of organisms known as the "enteritidis" or Salmonella group, the members of which are bacteriologically closely related to the typhoid and colon bacilli. It is possible that occasionally they gave rise to a toxæmia, but in the great majority of cases food-poisoning due to these organisms is an infective disease.

Food-poisoning is, therefore, the result of the action of the specific toxins of bacteria on persons who consume meat or other food infected with living organisms or their toxins, or both. The non-specific products should also, perhaps, be included; for though the evidence so far available is against the view that they take any part in the production of food-poisoning, it cannot be stated as a definitely ascertained fact that they never exert any influence. This definition at once excludes from the category of food-poisoning all cases of poisoning following the consumption of food containing arsenic, lead, strychnine, or other well-defined chemical substance, whether administered intentionally for criminal purposes or taken by accident. On the other hand, the generally accepted use of the term does not include such diseases as enteric fever, Malta fever, etc., though these are also the direct result of eating food specifically contaminated with the organisms of those diseases.

(To be continued)

On the Value of Combination.

In his address to the N.V.A. at Carnarvon, Mr. T. Salusbury Price, in commenting on the scheme for the affiliating of the veterinary societies, referred to the action of the British Medical Association in connection with the National Insurance Bill. The following extract from the address by the President B.M.A., Mr. Robert Saundby, carries the subject a little further.

"The National Insurance Bill is admittedly an adaptation of the German law of 1885, and a parliamentary paper has been circulated (Cd. 5679) containing the opinions of various authorities in Germany in support of the proposed legislation. With equal reason we may look to Germany for warnings and danger signals, and I would point out that the effect of placing the administration of medical benefits in Germany in the hands of committees controlled by working men has been to cause a bitter quarrel between the two parties, and has led to the formation in Germany of a medical organization with a membership of 21,210, known as the Leipzig Union (*Leipziger Verband*). Its object is to meet organization by organization, to create a fund for fighting purposes, and to form a league for conducting an agitation in the event of any action on the part of the societies contrary to the interests of the medical profession. It is, in fact, a trades union founded on the same lines and having similar objects to those of the workmen, and ready to use the same means, namely, a strike, to gain its end. Our German colleagues claim that although this has been said to be unworthy of a liberal profession, it is the necessary outcome of the situation created by Parliament, which has sought to

benefit the wage earners at the expense of the medical profession. So far the Leipzig Union has been victorious in all the contests in which it has been engaged, the best part of the medical profession having rallied absolutely under the banner of professional union. Those who have remained outside are only army doctors, university teachers of theoretical subjects, doctors without practice, and a few cautious medical bureaucrats; and no one knows better than the leaders of the workmen's societies and the directors of the insurance companies that they must rely only upon the most incapable medical aid should they quarrel with the medical profession.

What has been done in Germany can be done here. If Parliament forces a fight upon us we are not unorganized. The British Medical Association, which was founded with quite other objects, has been compelled by the militant tactics of the friendly societies and clubs to create a department for the defence of medical interests, and this is conducted with great ability by the Medical Secretary, Mr. J. Smith Whitaker. During the past year and owing to the threatened danger, over 3,000 new members have joined our ranks, and approximately we number to-day 24,400 members.

An Antirabic Vaccine.

The preparation of a safe and efficient antirabic vaccine has engaged the attention of Lieutenant-Colonel Sir D. Semple. His object was to secure a vaccine which would confer a high degree of immunity, be free from risk, and at the same time be capable of ready transportation without fear of deterioration. The methods most commonly practised at present (Pasteur's and Högyes') involve the injection of actual living virus, attenuated or diluted. They have been found quite satisfactory, but the introduction of a living virus is not free from objection if it can be shown that a dead virus is equally efficient. The technical difficulty was to discover the best means of killing and preserving the virus without destroying its immunizing properties. The alternatives of heat and antiseptics were discussed, and from previous experience with antityphoid vaccines, it was decided that an antiseptic such as carbolic acid was the most satisfactory agent. The method which Semple advocates is to make an 8 per cent. dilution of rabies virus in normal saline, to which 1 per cent. carbolic acid is added, and to keep this at a temperature of 37 C. for twenty-four hours. By this means the virus is killed. The mixture diluted with an equal bulk of saline solution gives a vaccine containing 4 per cent. virus and 0.5 per cent. carbolic acid. This was found to confer a high degree of immunity on monkeys, dogs, and rabbits, and the serum obtained from these animals had a well marked rabicidal action on living virulent virus. Its efficiency is therefore unquestionable, and is apparently as great as that obtained by the use of living virus. It retains its power for some time, and can therefore be conveyed considerable distances. The method was intended primarily for use in India.—*B.M.J.*

Nuclear Structure of Bacteria.

An important contribution to our knowledge of the nuclear structure of bacteria has recently been made by C. C. Dobell. Owing in some measure to difficulty of technique, the idea has become widely spread that bacteria, as a rule, are enucleate cells, but Dobell points out that in all bacteria which have been adequately studied some form of nuclear structure has been demonstrated. The morphology of the nucleus varies to a surprising extent, not only amongst different varieties of bacteria but also at different periods in the life of the same species. Judging by the changes in the nucleus, it may be deduced that the bacteria are not so simple as might appear, but that a more or less complicated life-cycle occurs. The various forms which the nucleus assumes may be summarized as follows: There may be a definite system of chromidia or chromatin granules, or there may be one or more aggregated masses of nuclear material. Again, the nucleus may take the form of a filament disposed in various ways; it may be branched or it may consist of strands or bent rods. Finally, it probably also occurs in the vesicular form characteristic of many other plants and animals. Mr. Dobell's conclusion is that we have no reasonable evidence to warrant the belief that enucleate bacteria exist. Investigations on the same subject have been made by H. Pénau, and in his latest publication he deals with the cytology of the anthrax bacillus. He recognizes a well-marked cycle of development in which five stages can be differentiated. At first the cell consists of an almost homogeneous mass of protoplasm which stains with basic dyes. After twelve hours' growth the nucleus appears at one pole as a definite body, which readily takes on nuclear strain. In the next stage it is replaced by a basophile reticulum, which gives the bacillus a vacuolated appearance. In about three days this reticulum becomes broken up into beadlike masses which collect together. The aggregate becomes more and more discrete, and eventually assumes an ovoid or globular form; finally it appears as the spore. According to Pénau, therefore, the spore is the direct descendant of the nucleus.—*B.M.J.*

Personal.

BRYDEN.—On Sept. 2, at 73 Bishop's Park Road, Fulham, the wife of R. Bryden, F.R.C.V.S., of a son.

OBITUARY.

WILLIAM OWEN WILLIAMS, F.R.C.V.S., The University, Liverpool.
Graduated, New, Edin: April, 1881.

Prof. Williams, F.R.C.V.S., F.R.S.E., was born in Bradford, Yorkshire, in 1860, he was the son of the late Prof. William Williams, Principal of the New Veterinary College, Edinburgh. It was at this College that Prof. W. Owen Williams received his first instruction in veterinary science, which he supplemented at the Alfort Veterinary College, Paris. Returning to Edinburgh he rejoined the New College, becoming hospital surgeon and demonstrator, then Professor of Veterinary Medicine and Surgery as applied to the ox, sheep, pig, and dog, and finally Principal in 1900. He was President of the Council of the Royal College of Veterinary Surgeons, 1902-4, and President of the National Veterinary Association in 1905-6. In 1904 he accepted the Professorship of Veterinary Medicine and Surgery in the University of Liverpool. From 1903 Professor Williams had been Veterinary Surgeon to the Establishment of King Edward's and King George's Stables. Prof. Williams was the author of many contributions to veterinary science. He edited a work on the "Principles and Practice of Veterinary Medicine and Surgery," had been Editor of *The Veterinary Journal*, and revised Fleming's "Operative Surgery," vol. II. During the Boer War Prof. Williams acted as supervisor of horses sent out by the War Office.

Prof. Williams married in 1885 Annie Christine, daughter of Mr. John Flint, of Glasgow, by whom he had two sons and a daughter. He had been in ill-health for some days, and died suddenly, while talking to his son. His age was 51 years.

AARON SISSONS, M.R.C.V.S., Whinnah, Lamplough, Cumberland. Graduated, Edin: April, 1870.

Death occurred on August 18th, at his residence, from general paralysis. Aged 69 years.

ARMY VETERINARY SERVICE.

Extract from *London Gazette*,
WAR OFFICE, WHITEHALL, Aug 2

TERRITORIAL FORCE. OFFICERS TRAINING CORPS. 9

Royal Veterinary College of Ireland Contingent, Senior Division.—Lieut. A. E. Mettam is granted the provisional rank of Major. Dated July 1.

CORRESPONDENCE.

DISEASES OF THE DIGESTIVE ORGANS IN THE OX.

Sir,

I must thank Mr. Mayall for his courtesy in replying to my queries, and beg to state that his explanations and views on the above will prove of marked assistance to me in the work on which I am engaged.

With reference to the queries of "Enquirer" unfortunately I am in the humble position of querist myself, and am seeking for information. However, in reply to Query 1, I should say that the ingesta in the omasum is *not always* dry and in the form of leaves, as I have examined the organ on several occasions and found the contents quite soft, in fact succulent in some cases.

I think the the proper authority to answer this query would be an inspector of abattoirs, who has ample opportunities of observing the condition of this organ in normal animals.

With regard to the mucous, epithelial, or papillary membrane peeling off easily, I have not observed this in the omasum, but I know that it does occur in the rumen, if the organ is not examined until some time after death.

Query 2.—This to a great extent depends on the answer to query 1. I doubt the existence of such a condition as impaction of the omasum, but as there are many degrees of dryness, it is difficult to know where to draw the line. If the functions of the other divisions of the stomach are in abeyance, one would expect to find the contents of the omasum hard and dry.

The answer to the last query is—No, but there must be a number of veterinary surgeons who have paid attention to the condition of the omasum in a normal state, and who have opportunities of doing so. It was with a view to obtain definite information from a number of such observers that I put forward the queries, and I am hopeful that some useful information may result.

The opinions of observant practitioners are of far greater value than the information derived from text books, as many of the latter follow on the lines of their predecessors.—Yours, etc.,

Sept. 2. E. WALLIS HOARE.

"SIDE-LINES" IN PRACTICE.

Sir,

I agree with many of the remarks made by your old and respected correspondent "Old Obadiah," who, I am glad to see, has once again come out of his hibernation to give us a few of his choice "tit-bits."

The young veterinary surgeon should obtain a fair knowledge appertaining to the smaller things of veterinary practice; he should try his hand at some of the Aristotlean operations, such as pig, cat, and dog spaying, caponizing, lamb cutting, etc., even if he relinquishes such work after obtaining the mastery of them. There is no disgrace in doing any small, if done honourably, and they often lead to higher things or aspirations. Pasteur studied the diseases of beer, silkworms, and grapes which led him to discover the true nature of the infectious diseases of man and animals. Jenner studied old women's talk which led him to put vaccination on a sound basis. Darwin studied earthworms, flowers, etc., and from the conclusions drawn from them revolutionised modern thought and gained for himself the title of the greatest mind of the Victorian period. These few illustrations may depress the prig or conceited fool, but will perhaps give the ambitious hope.

As to avian pathology there is a wide scope and the knowledge gained from a study of it might be adopted for veterinary and human practice. But attention should also be given to the normal animal during life and after death. The examination of fish, reptiles, all classes of birds and the lesser mammals after death will frequently open his eyes and make him put on his thinking cap, especially as regards parasitism. As it is now, his post-graduate study is too narrow and, in consequence, his view of things, physiological and pathological, becomes very limited. The means, however, are generally at hand, but the opportunity is rarely seized.

Concerning "Old Obadiah's" statement that no book on avian diseases, beyond the one brought out by Dr. Salmon in 1899, has appeared from the pen of a veterinary surgeon, I believe that is not quite correct, because as a matter of fact there are several, but perhaps out-of-date. Certainly there are many first class articles on the infectious diseases of birds that have appeared, from time to time, in the various veterinary journals, and which have been penned by such eminent authorities as Sir John M'Fadyean, Bang, Perroncito, Cettani, Marcone, Tartartowsky and Marx and Sticker, and many others too numerous to mention. Even several papers on the same subjects have been written by young Colonial and continental veterinary surgeons, who have not thought avian pathology beneath them. As it was, avian pathology revolutionised our ideas of immunity and lead up to the present state of our knowledge. Surely this should be enough for "Old Obadiah," unless he wants to see a good modern book, written by a practical man, having had a scientific training and with a wide range of knowledge. It is quite true there is room for such a book. But where is the man? There are plenty of pot-boilers.

Respecting parasitism in birds and other animals, I believe its importance has been *unduly inflated*. I read in the recent report on "Grouse disease" *that 95 per cent. of the healthy birds* also harboured the *Trichostrongylus pergracilis* (Cobbold, who was also my preceptor, was content to call it *Stronylus pergracilis*) in their system! Cobbold says "As regards the so-called "grouse-disease," during one season it may be due to tapeworms, during another to strongyles, during a third to both these parasites. Unfortunately, other avian epizootics, not necessarily due to parasites of any kind, may be mistaken for helminthic epizooty." (*Parasites of Man and Animals*, 1879.)

I have given a little attention to parasitism in birds and other animals killed when apparently healthy or died from disease, and rarely found parasites absent, providing no vermifuge had been administered during life.

I am not speaking from imagination nor worshipingly following the teaching of authorities when I repeat with all seriousness that the effect of parasites on animal life is greatly exaggerated. Their presence, however, is an *easy* explanation of the cause of disease.—Yours, etc.,

ENQUIRER.

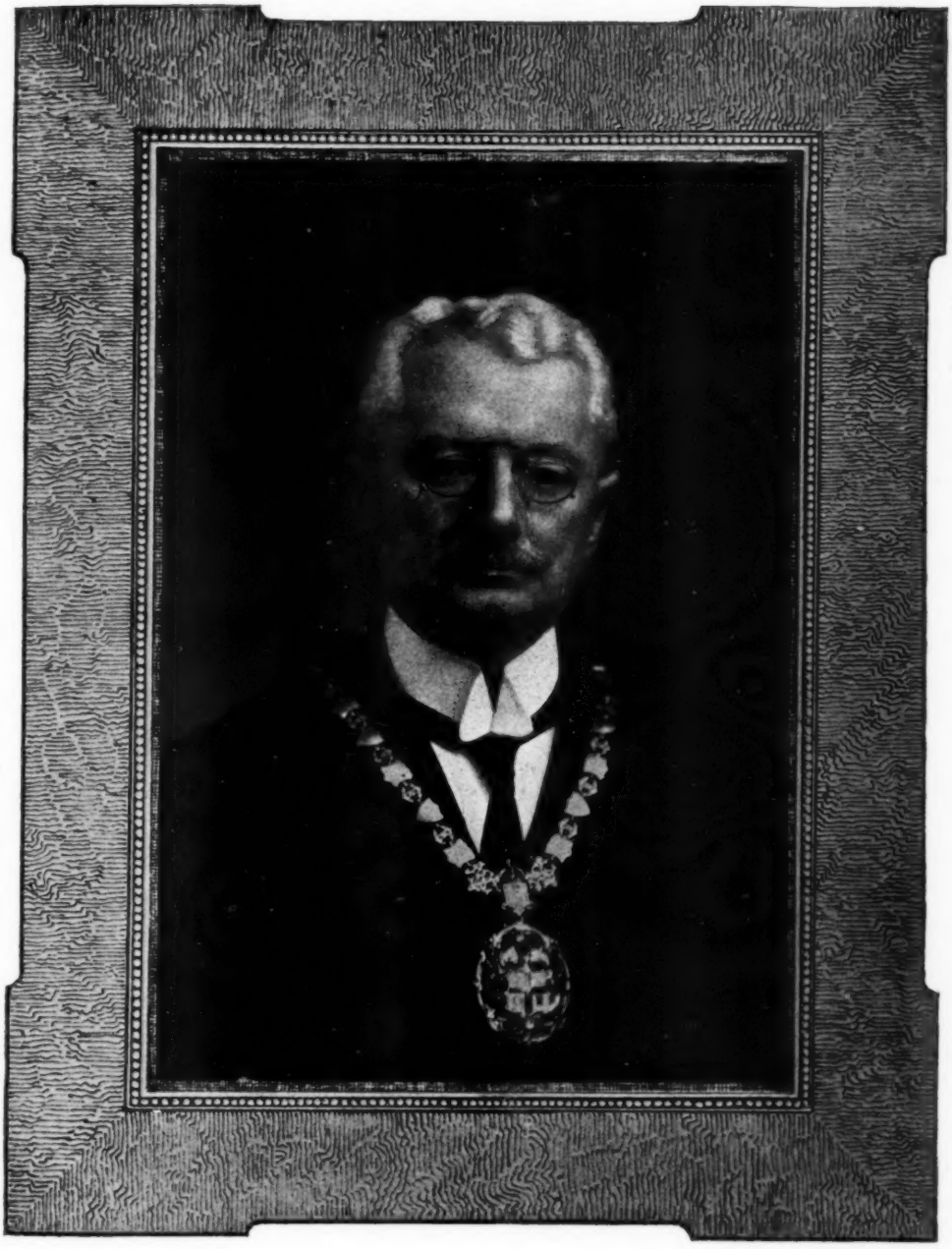
CAN R.Ps. USE V.S.? *NO.*

Sir,

I have lately come across two certificates issued by a Registered Practitioner who uses the title V.S., I have had legal opinion on the matter, and the result is that the use of V.S. by a registered practitioner is a direct infringement of the Veterinary Surgeons Act, 1881, Sections 15 and 16, where it is stated that "no person registered under this Section shall be deemed to be a *member* of the Royal College." Section 16 says: "If after the passing of this Act any person *not* being a *Fellow* or Member of the Royal College of Veterinary Surgeons takes or uses any name, title, or addition by letters placed after his name is liable to a fine of £20.

Here we have a man usurping a title to which he has not the slightest legal claim, and is endeavouring to hoodwink the public by flying colours to which he has not the most remote title, or even, I hope, will have.—Yours faithfully

M.R.C.V.S.



Elliott & Fry.

Prof. W. O. WILLIAMS, F.R.C.V.S., F.R.S.Edin.

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